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PATENT

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UTILITY PATENT APPLICATION TRANSMITTAL LETTER
AND FEE TRANSMITTAL FORM (37 CFR 1.53(b))

BOX PATENT APPLICATION

Assistant Commissioner for Patents

Washington, DC 20231

Sir:

Transmitted herewith for filing under 37 CFR 1.53(b) is:

- ☒ a patent application
☐ a Continuation ☐ a Divisional ☐ a Continuation-in-Part (CIP)
of prior application no.: ; filed
☐ A Small Entity Statement(s) was filed in the prior application; Status still proper and desired.

Inventor(s) or Application Identifier:

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Entitled: **METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR
PROVIDING SECURE CLIENT PROFILE COMPLETION BY NETWORK
INTERMEDIARIES**

Enclosed are:

1. ☒ Application Transmittal Letter and Fee Transmittal Form (*A duplicate is enclosed for fee processing*)
2. ☒ 38 pages of Specification (including 60 claims)
3. ☒ 5 sheets of Formal Drawings (35 USC 113)
4. ☒ Oath or Declaration
 - a. ☒ newly executed (*original or copy*)
 - b. ☐ copy from prior application (37 CFR 1.63(d) (*for continuation/divisional*) [Note Box 5 Below]
 - c. ☐ DELETION OF INVENTOR(S) (*Signed statement deleting inventor(s) named in the prior application*)
5. ☐ Incorporation By Reference (*useable if box 4b is checked*)

The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Microfiche Computer Program (*Appendix*)
7. ☒ Assignment papers (*cover sheet(s) and document(s)*)
8. ☐ Small Entity Statement(s)
9. ☒ Information Disclosure Statement, PTO-1449, and 3 references cited
10. ☐ Preliminary Amendment (*Please enter all claim amendments prior to calculating the filing fee.*)
11. ☐ English Translation Document
12. ☐ Certified Copy of Application No. ; Filed

In re: Hild, et al.
Filed: March 22, 2000
Attorney Docket No. 5577-190

13. ☐ Sequence Listing/ Sequence Listing Diskette
a. ☐ computer readable copy
b. ☐ paper copy
c. ☐ statement in support
14. ☐ An Associate Power of Attorney
15. ☒ Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
16. ☐ Other:

The fee has been calculated as shown below:

	Column 1 No. Filed	Column 2 No. Extra	Small Entity Rate Fee	Large Entity Rate Fee
BASIC FEE			\$345.00	\$690.00
TOTAL CLAIMS	60- 20 =	40	x 9 = \$	x 18 = \$720.00
INDEP CLAIMS	6 - 3 =	3	x 39 = \$	x 78 = \$234.00
<input type="checkbox"/> MULTIPLE Dependent Claims Presented			+ 130 = \$	+ 260 = \$
If the difference in Col. 1 is less than zero, Enter "0" in Col. 2			Total \$	Total \$1644.00

- ☐ A check in the amount of \$ _____ to cover the filing fee is enclosed.
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☐ The Commissioner is hereby authorized to credit overpayments or charge the following fees associated with this communication to Deposit Account No. 09-0461.
a. ☐ Additional filing fees under 37 CFR 1.16 for presentation of extra claims.
b. ☐ Additional patent application processing fees under 37 CFR 1.17.

Respectfully submitted,



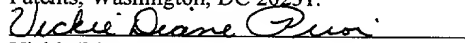
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Vickie Diane Prior

Date of Signature: March 22, 2000

METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR
PROVIDING SECURE CLIENT PROFILE COMPLETION BY NETWORK
INTERMEDIARIES

Field of the Invention

The present invention relates to client profiles
and more particularly relates to the security of client
profile information.

Background of the Invention

With the increase in customized information
provided to clients by servers, there has also been an
increase in the transmission of client information from
the client to the server. A server may utilize client
information, among other things, to tailor content
which is provided to the client. For example, if the
server is informed of the location of a client, then
the server may provide content to the client based on
that location. Similarly, if the client informs the
server of the network through which it is connected,

then the server may utilize this information to provide network specific information to the client.

As an example, if a mobile client is connected to a network in, for example, Research Triangle Park,
5 North Carolina, in the United States, then, if the client provides profile information to the server identifying its location as in North Carolina, information about North Carolina may be provided to the client by a server. If the client is then later
10 connected to the server through a network in Tokyo, Japan, and the client provides profile information to the server identifying its location as being in Tokyo, then the server may provide information about Tokyo to the client.

15 Various methods exist by which a client may communicate its preferences and capabilities to a server. For example, information may be embedded within a Hyper-Text Transport Protocol (HTTP) user-agent field, or it may be embedded within a Universal
20 Resource Locator (URL) itself. Emerging standards such as the W3C Composite Capability/Preference Profile (CC/PP) standard and the WAP Forum's User-Agent Profiles standard similarly define formats by which information may be embedded by the client in HTTP
25 requests.

However, it is not always the case that information which may be required by the server to support such capabilities is actually available to the client. For example, the client may not have the
30 location information which is to be provided to the server. This may occur if the client is not associated

with a Global Positioning System (GPS). Therefore, the client may be unable by itself to provide such location information to the server. However, such information may be available to a network intermediary, i.e. a data processing system in the path between the client and the server. While the network intermediary may have such information, the network intermediary may need to be informed that such information should be passed on to the server as part of the client's profile.

However, legal considerations may prevent a network intermediary, such as a service provider, from providing information to a third party service without the end user's explicit permission. Thus, the client may need to explicitly inform the network intermediary to pass its location information on to the server.

One issue which may arise when network intermediaries provide information on behalf of a client is security. Because information is not being provided directly by the client, it may be necessary to determine the authenticity of such information and to assure that the information is not be provided by someone posing as the client. However, privacy protocols, such as the Platform for Privacy Preferences Project (P3P), operate end-to-end between the client and the server and, therefore, may be unsuitable for providing authorization to network intermediaries to provide information about a client to a server. Accordingly, a need exists for improvements in the security of how client profile information is provided to servers.

Summary of the Invention

Embodiments of the present invention include methods, systems and computer program products which provide profile information associated with a client to
5 a server by generating, at the client, a profile document containing profile information associated with the client and incorporating in the profile document a designator which indicates that profile information identified by the designator is not provided by the
10 client and is provided by a network intermediary in a path between the client and the server. The designator in the profile document is encrypted utilizing a key associated with the client and the profile document with the encrypted designator transmitted from the
15 client to the server utilizing the path.

In particular embodiments of the present invention, the designator incorporated into the profile document comprises a profile information identifier which identifies a type of profile information in the
20 profile document and a wildcard designator associated with the profile information identifier which indicates that the type of profile information associated with the profile information identifier is provided by a network intermediary in the path between the client and
25 the server. Furthermore, the encryption of the designator may be provided by encrypting the wildcard designator utilizing a private key associated with the client to provide the encrypted designator.

In additional embodiments of the present
30 invention, the wildcard designator comprises a client identification associated with the client, a token and

an encrypted value. In such embodiments, the encryption of the wildcard designator may be accomplished by encrypting the token so as to provide the encrypted value. Alternatively, the token and a predefined character string may be encrypted. The token may be a randomly generated value.

In still further embodiments of the present invention, the designator is encrypted by encrypting the wildcard designator and the profile information identifier utilizing a private key associated with the client to provide the encrypted designator. In such embodiments, the wildcard designator may be a client identification associated with the client, a token and an encrypted value. Encrypting the wildcard designator and the profile information identifier may then be accomplished by encrypting the token and the profile information identifier so as to provide the encrypted value. Furthermore, the encryption of the token and the profile information identifier may be provided by encrypting the token, the profile information identifier and a predefined character string. In a still further embodiment of the present invention, the designator is encrypted utilizing a public key of the network intermediary.

In other embodiments of the present invention, the profile document transmitted by the client is received at the network intermediary. The network intermediary decrypts the designator incorporated in the received profile document, incorporates the profile information identified by the designator into the profile document

to provide a modified profile document and transmits the modified profile document to the server.

5 In yet other embodiments of the present invention, methods, systems and computer program products may provide client profile information to a server, by receiving, at a network intermediary, a profile document from a client for forwarding to the server. The network intermediary determines if a portion of the profile document is encrypted and decrypts the
10 encrypted portion of the profile document. The decrypted portion of the profile document is parsed to determine if a designator is provided in the decrypted portion of the profile document which indicates that profile information identified by the designator is to
15 be incorporated into the profile document by the network intermediary. If so, the network intermediary incorporates the identified profile information in the profile document so as to provide a modified profile document and transmits the modified profile document
20 to the server.

In further embodiments, the designator incorporated into the profile document comprises a profile information identifier which identifies a type of profile information in the profile document and a
25 wildcard designator associated with the profile information identifier which indicates that the type of profile information associated with the profile information identifier is provided by the network intermediary. In additional embodiments, decrypting
30 the designator may be carried out by decrypting the encrypted portion of the document profile utilizing a

private key associated with the client to provide the designator.

In still further embodiments, the wildcard designator may be a client identification associated with the client, a token and an encrypted value. In such a case, the encrypted portion of the document profile may be decrypted by decrypting the encrypted value. Furthermore, the token may be a randomly generated value.

In yet other embodiments of the present invention, the encrypted portion of the document profile may be decrypted by decrypting the encrypted portion of the profile document to provide a wildcard designator and the profile information identifier utilizing a private key associated with the client to provide the decrypted designator.

Furthermore, the encrypted portion of the document profile may also be decrypted utilizing a private key of the network intermediary.

While the invention has been described above primarily with respect to the method aspects of the invention, both systems and/or computer program products are also provided.

Brief Description of the Drawings

Figure 1 is a block diagram of a client-server system according to embodiments of the present invention;

Figure 2 is a block diagram of a data processing system according to embodiments of the present invention;

Figure 3 is a more detailed block diagram of data processing systems according to embodiments of the present invention;

Figure 4 is a flowchart illustrating operations of a client according to embodiments of the present invention; and

Figure 5 is a flowchart illustrating operations of a network intermediary according to embodiments of the present invention.

Detailed Description of Preferred Embodiments

The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

As will be appreciated by those of skill in the art, the present invention may be embodied as a method, data processing system, or computer program product. Accordingly, the present invention may take the form of an entirely hardware embodiment, an entirely software embodiment or an embodiment combining software and hardware aspects. Furthermore, the present invention may take the form of a computer program product on a computer-usable storage medium having computer-usable program code means embodied in the medium. Any suitable

computer readable medium may be utilized including hard disks, CD-ROMs, optical storage devices, or magnetic storage devices.

5 Computer program code for carrying out operations of the present invention may be written in an object oriented programming language such as Java®, Smalltalk or C++. However, the computer program code for carrying out operations of the present invention may also be written in conventional procedural programming
10 languages, such as the "C" programming language. The program code may execute entirely on the user's computer, partly on the user's computer, as a stand-alone software package, partly on the user's computer and partly on a remote computer or entirely on the remote computer. In the latter scenario, the remote
15 computer may be connected to the user's computer through a local area network (LAN) or a wide area network (WAN), or the connection may be made to an external computer (for example, through the Internet using an Internet Service Provider).

20 The present invention is described below with reference to flowchart illustrations and/or block diagrams of methods, apparatus (systems) and computer program products according to an embodiment of the invention. It will be understood that each block of the flowchart illustrations and/or block diagrams, and combinations of blocks in the flowchart illustrations and/or block diagrams, can be implemented by computer
25 program instructions. These computer program instructions may be provided to a processor of a general purpose computer, special purpose computer, or
30

other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for
5 implementing the functions specified in the flowchart and/or block diagram block or blocks.

These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable data processing
10 apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including instruction means which implement the function specified in the flowchart and/or block diagram block or blocks.

The computer program instructions may also be loaded onto a computer or other programmable data processing apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer
15 implemented process such that the instructions which execute on the computer or other programmable apparatus provide steps for implementing the functions specified in the flowchart and/or block diagram block or blocks.

As is described in more detail below, the present
25 invention provides security in the generation of profile information by network intermediaries. Such security is provided by encrypting information in a client profile document which specifies that the network intermediary is to provide the client profile
30 information. Embodiments of the present invention may be utilized in systems such as those described in

concurrently filed and commonly assigned United States Patent Application entitled "Method and System for Designating Required Device Attributes for Embedding in a World-Wide Web Document Request," attorney docket number RSW9-99-132, the disclosure of which is incorporated herein by reference as if set forth fully herein.

Various embodiments of the present invention will now be described with reference to **Figures 1** through **5**. **Figure 1** illustrates a network environment in which embodiments of the present invention may be utilized. As seen in **Figure 1**, a client data processing system **10**, such as a personal computer, laptop computer, pervasive computing device such as a personal data assistant (PDA), smartphone, or other mobile terminal, communicates over networks **12** and **16** to another data processing system which acts as a server **18**. In the communications between the client **10** and the server **18**, there may be a data processing system which acts as a network intermediary **14** and which receives messages from the client **10** and forwards the messages on to the server **18**. Examples of such network intermediaries **14** include proxy servers, gateway servers or service providers, however, any data processing system that receives messages from the client **10** and forwards them to the server **18** may be considered a network intermediary **14** as that term is used herein.

Referring now to **Figure 2**, an exemplary embodiment of a data processing system **230** in accordance with embodiments of the present invention typically includes

input device(s) 232 such as a keyboard or keypad, a display 234, and a memory 236 that communicate with a processor 238. The data processing system 230 may further include a speaker 244, and an I/O data port(s) 246 that also communicates with the processor 238. The I/O data port 246 can be used to transfer information between the data processing system 230 and another computer system or a network (e.g., the Internet). These components may be conventional components such as those used in many conventional pervasive computing devices which may be configured to operate as described herein. Furthermore, as will be appreciated by those of skill in the art, the data processing system 230 may be configured as the client 10, the network intermediary 14 or the server 18.

Figure 3 is a block diagram of embodiments of data processing systems that illustrates systems, methods, and computer program products in accordance with the present invention. The processor 238 communicates with the memory 236 via an address/data bus 248. The processor 238 can be any commercially available or custom microprocessor. The memory 236 is representative of the overall hierarchy of memory devices containing the software and data used to implement the functionality of the data processing system 230. The memory 236 can include, but is not limited to, the following types of devices: cache, ROM, PROM, EPROM, EEPROM, flash memory, SRAM, and DRAM.

As shown in Figure 3, the memory 236 may include several categories of software and data used in the

data processing system 230: the operating system 252;
the application programs 254; the input/output (I/O)
device drivers 258; and the data 256. As will be
appreciated by those of skill in the art, the operating
5 system 252 may be any operating system suitable for use
with a data processing system, such as OS/2, AIX or
System390 from International Business Machines
Corporation, Armonk, NY, Windows95, Windows98 or
Windows2000 from Microsoft Corporation, Redmond, WA,
10 Unix or Linux. The I/O device drivers 258 typically
include software routines accessed through the
operating system 252 by the application program 254 to
communicate with devices such as the input devices 232,
the display 234, the speaker 244, the I/O data port(s)
15 246, and certain memory 236 components. The
application programs 254 are illustrative of the
programs that implement the various features of the
data processing system 230 and preferably include at
least one application which may utilize the secure
20 profile aspects of embodiments of the present
invention. Finally, the data 256 represents the static
and dynamic data used by the application programs 254,
the operating system 252, the I/O device drivers 258,
and other software programs that may reside in the
25 memory 236.

As is further seen in **Figure 3**, the application
programs 254 preferably include a client profile module
260. The client profile module 260 preferably carries
out operations as described herein for providing secure
30 profile information from network intermediaries. As

such, the client profile module may be different depending on whether the system illustrated in **Figure 3** is the client **10** or a network intermediary **14**. Alternatively, a single client profile module **260** may be utilized for both the client **10** and the network intermediary **14**. Furthermore, the data portion of memory **236** preferably includes a client profile document **270** which provides the client profile information and which may be transmitted from the client **10** through the network intermediary **14** to the server **18**. Preferably, at least a portion of the client profile document **270** is encrypted when transmitted from the client **10** to the network intermediary **14**.

While the present invention is illustrated, for example, with reference to a separate client profile module **260**, as will be appreciated by those of skill in the art, the client profile module **260** may also be incorporated into the operating system **252**. Thus, the present invention should not be construed as limited to the configuration of **Figure 3** but is intended to encompass any configuration capable of carrying out the operations described herein.

Embodiments of the present invention will now be described in more detail with reference to **Figures 4** and **5** which are flowchart illustrations of operations carried out by the client **10** and the network intermediary **14** according to embodiments of the present invention. As seen in **Figure 4**, the client **10** generates a client profile document (block **100**). The

client profile document may be transmitted with a HTTP request and may be any agreed upon format. For example, the client profile document may be a cookie, a Hyper-Text Markup Language (HTML) document, Extensible Markup Language (XML) document or other such language document or it may be a document in any suitable predefined format. The format of the particular client profile document may depend on the format expected by the server 18. While the client profiles are described as a "document" herein, as will be appreciated by those of skill in the art, a document is utilized herein to refer to a collection of profile information sent from the client 10 to the server 18.

As is further seen in **Figure 4**, the client 10 incorporates designator(s) into the client profile document which specify information to be provided by a network intermediary 14 (block 102). The designator incorporated into the client profile document authorizes the particular property specified by the designator to be provided by a network intermediary 14, such as a proxy server, gateway server or service provider. As an example, the designator may include a wildcard identifier, such as "\$OPEN", which specifies that the associated property is to be provided by a network intermediary 14. In such embodiments a client profile document may contain the following:

...

<rdf:Description>

<prf:BearerNetwork>SMS</prf:BearerNetwork>

<prf:Bandwidth>9600</prf:Bandwidth>

<prf:Location>\$OPEN</prf:Location>

</rdf:Description>

...

The \$OPEN wildcard specifies that the Location information maybe provided by a network intermediary

5 14.

As is seen above, the client profile document preferably includes as part of the designator a profile information identifier which identifies the information to be provided by the network intermediary 14. For
10 example, the <prf:Location>...</prf:Location> sequence in the above example provides an identification that location information is to be provided by the network intermediary 14.

While incorporation of the designator in the
15 client profile document may specify what information is to be provided by a network intermediary, merely providing the designator may allow improper authorization by someone posing as a client and authorizing a network intermediary to incorporate
20 information about the client in the client profile document. However, as is seen in **Figure 4**, the designator may be encrypted by the client 10 (block 104) and the client profile document transmitted to the server with the encrypted designator (block 106). By
25 encrypting the designator, the client may "sign" the designator, such that network intermediaries can be assured that the client generated the request that information be incorporated into the profile by the network intermediary. Thus, the problem of an
30 unauthorized user obtaining client profile information from a network intermediary may be reduced.

Differing embodiments of the present invention may encrypt the designator in different manners. For example, in one embodiment, the client signs the wildcard "\$OPEN" utilizing its own private key.

5 Furthermore, the wildcard may be changed from "\$OPEN" to include client information and/or randomly generated information. For example, the wildcard may take the form of:

<OPEN ID="Client ID" Random="12391321">[VAL]</OPEN>

10 where ID is a client identification, Random is a randomly generated token and [VAL] contains the randomly generated token encrypted using the private key of the client. Optionally, a character string could be incorporated with the token for encryption. For example, the token may be concatenated with the
15 string "\$OPEN" and then encrypted with the client's private key.

In still further embodiments of the present invention, the entire profile sequence may be
20 encrypted. Thus, in the above example, the <prf:Location>...</prf:Location> sequence may be encrypted. This may prevent someone from tampering with the request by, for example, changing the requested client property. The requested property may
25 also be incorporated into [VAL] by encrypting the token with the identifier of the property. For example, the token may be encrypted with

<prf:Location>\$OPEN</prf:Location>

As will be appreciated by those of skill in the art,
30 only a portion of the identifier need be encrypted. Furthermore, various other encryption and/or designator

formats may be utilized while still benefitting from the teachings of the present invention.

In still further embodiments of the present invention, the client may specify which network intermediary is to be authorized to provide the client information by, for example, further encrypting the designator, such as the "<OPEN...>" sequence described above, with a public key of the network intermediary 14. This may reduce the chance of fraud by ensuring that only the authorized network intermediary may know which attribute is requested.

Figure 5 illustrates operations of a network intermediary 14 according to embodiments of the present invention. As seen in **Figure 5**, the network intermediary 14 receives the client profile document (block 120) by, for example, receiving a HTTP request containing the client profile document. The network intermediary 14 then evaluates the client profile document and decrypts any encrypted portions of the client profile document (block 122). If portions of the client profile document are encrypted with the public key of the network intermediary 14, then the network intermediary 14 utilizes its private key to first decrypt portions of the client profile document encrypted with its public key. Otherwise, the network intermediary 14 may utilize its copy of the public key associated with the client specified in the <OPEN...> field of the client profile document to decrypt the [VAL] portion of the field.

If the decryption is successful and the network intermediary is capable of providing the requested information, then the network intermediary **14** then incorporates the requested information into the client profile document (block **124**). Such incorporation may take the form of replacing the <OPEN...> field with a field specifying the requested information. Optionally, this information may then be encrypted if further security is required. In any event, the network intermediary **14** may forward the modified client profile document on to the server (block **126**). Furthermore, the network intermediary **14** may archive the received <OPEN...> field so as to be able to prove at a later date that the incorporation of the client profile information was authorized by the client.

The flowcharts and block diagrams of **Figures 1** through **5** illustrate the architecture, functionality, and operation of a possible implementation providing access to cryptographic functions from a common source according to the present invention. In this regard, each block in the flow charts represents a module, segment, or portion of code, which comprises one or more executable instructions for implementing the specified logical function(s). It should also be noted that, in some alternative implementations, the functions noted in the blocks may occur out of the order noted in the figures. For example, two blocks shown in succession may in fact be executed substantially concurrently or the blocks may sometimes be executed in the reverse order, depending upon the functionality involved. Thus, while the present

invention is described as first generating a client profile document, then incorporating designators and encrypting the designators, as will be appreciated by those of skill in the art, the generation,

5 incorporation and encryption may be carried out as a single operation or combination of operations. Accordingly, the present invention should not be construed as limited to discrete operations but should be construed as teaching the results of the operations
10 irrespective of the division of actions which produced such results.

While the present invention has been described with reference to information which is not available to a client, as will be appreciated by those of skill in
15 the art in light of the present disclosure, information may be provided by a network intermediary for other reasons. For example, the information may be available to a client, however, the bandwidth of the client connection may be such that sending the information
20 from a network intermediary may be more efficient.

Furthermore, the present invention has been described with reference to HTTP requests, however, the present invention may be applicable to any protocol having an intermediary data processing system which may
25 provide information specified by a protocol field on behalf of a client to a server. Thus, the present invention should not be construed as limited to HTTP embodiments of the present invention described in detail herein.

30 In the drawings and specification, there have been disclosed typical preferred embodiments of the

invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being set forth in the following claims.

THAT WHICH IS CLAIMED:

1. A method of providing profile information associated with a client to a server, the method comprising the steps of:

5 generating, at the client, a profile document containing profile information associated with the client;

10 incorporating in the profile document a designator which indicates that profile information identified by the designator is not provided by the client and is provided by a network intermediary in a path between the client and the server; and

transmitting the profile document with the designator from the client to the server utilizing the path.

5 2. A method according to Claim 1, wherein the designator incorporated into the profile document comprises a profile information identifier which identifies a type of profile information in the profile document and a wildcard designator associated with the profile information identifier which indicates that the type of profile information associated with the profile information identifier is provided by a network intermediary in the path between the client and the server.

10

3. A method according to Claim 1, further comprising the step of encrypting the designator in the profile document utilizing a key associated with the client.

4. A method according to Claim 3, wherein the step of encrypting the designator comprises the step of encrypting the wildcard designator utilizing a private key associated with the client to provide the encrypted designator.

5. A method according to Claim 4, wherein the wildcard designator comprises a client identification associated with the client, a token and an encrypted value and wherein the step of encrypting the wildcard designator comprises the step of encrypting the token so as to provide the encrypted value.

6. A method according to Claim 5, wherein the step of encrypting the token further comprises the step of encrypting the token and a predefined character string.

7. A method according to Claim 5, wherein the token is a randomly generated value.

8. A method according to Claim 3, wherein the step of encrypting the designator comprises the step of encrypting the wildcard designator and the profile information identifier utilizing a private key associated with the client to provide the encrypted designator.

9. A method according to Claim 8, wherein the wildcard designator comprises a client identification associated with the client, a token and an encrypted

5 value and wherein the step of encrypting the wildcard designator and the profile information identifier comprises the step of encrypting the token and the profile information identifier so as to provide the encrypted value.

10. A method according to Claim 8, wherein the step of encrypting the token and the profile information identifier further comprises the step of encrypting the token, the profile information identifier and a predefined character string.

11. A method according to Claim 10, wherein the token is a randomly generated value.

12. A method according to Claim 1, further comprising the step of encrypting the designator utilizing a public key of the network intermediary.

13. A method according to Claim 3, further comprising the steps of:

receiving the profile document transmitted by the client at the network intermediary; and

5 wherein the network intermediary carries out the steps of:

decrypting the designator incorporated in the profile document if the designator incorporated in the profile document is encrypted;

10 incorporating the profile information identified by the designator into the profile document to provide a modified profile document if the network intermediary

has available the profile information indentified by
the designator;

15 transmitting the modified profile document to the
server.

14. A method of providing client profile
information to a server, the method comprising the
steps of:

5 receiving, at a network intermediary, a profile
document from a client for forwarding to the server;
 determining if a portion of the profile document
is encrypted;

 decrypting the encrypted portion of the profile
document;

10 parsing the decrypted portion of the profile
document to determine if a designator is provided in
the decrypted portion of the profile document which
indicates that profile information identified by the
designator is to be incorporated into the profile
15 document by the network intermediary;

 incorporating the identified profile information
in the profile document so as to provide a modified
profile document; and

20 transmitting the modified profile document to the
server.

15. A method according to Claim 14, wherein the
designator incorporated into the profile document
comprises a profile information identifier which
identifies a type of profile information in the profile
5 document and a wildcard designator associated with the

profile information identifier which indicates that the type of profile information associated with the profile information identifier is provided by the network intermediary.

5 16. A method according to Claim 15, wherein the step of decrypting the designator comprises the step of decrypting the encrypted portion of the document profile utilizing a private key associated with the client to provide the designator.

5 17. A method according to Claim 16, wherein the wildcard designator comprises a client identification associated with the client, a token and an encrypted value and wherein the step of decrypting the encrypted portion of the document profile comprises the step of decrypting the encrypted value.

18. A method according to Claim 16, wherein the token is a randomly generated value.

19. A method according to Claim 15, wherein the step of decrypting the encrypted portion of the document profile comprises the steps of:

5 decrypting the encrypted portion of the profile document to provide a wildcard designator; and

decrypting the profile information identifier utilizing a private key associated with the client to provide the decrypted designator.

20. A method according to Claim 14, further comprising the step of decrypting the encrypted portion of the document profile utilizing a private key of the network intermediary.

21. A system for providing profile information associated with a client to a server, comprising:

means for generating, at the client, a profile document containing profile information associated with the client;

means for incorporating in the profile document a designator which indicates that profile information identified by the designator is not provided by the client and is provided by a network intermediary in a path between the client and the server; and

means for transmitting the profile document with the designator from the client to the server utilizing the path.

22. A system according to Claim 21, wherein the designator incorporated into the profile document comprises a profile information identifier which identifies a type of profile information in the profile document and a wildcard designator associated with the profile information identifier which indicates that the type of profile information associated with the profile information identifier is provided by a network intermediary in the path between the client and the server.

23. A system according to Claim 21, further comprising means for encrypting the designator in the profile document utilizing a key associated with the client.

24. A system according to Claim 23, wherein the means for encrypting the designator comprises means for encrypting the wildcard designator utilizing a private key associated with the client to provide the encrypted designator.

25. A system according to Claim 24, wherein the wildcard designator comprises a client identification associated with the client, a token and an encrypted value and wherein the means for encrypting the wildcard designator comprises means for encrypting the token so as to provide the encrypted value.

26. A system according to Claim 25, wherein the means for encrypting the token further comprises means for encrypting the token and a predefined character string.

27. A system according to Claim 25, wherein the token is a randomly generated value.

28. A system according to Claim 23, wherein the means for encrypting the designator comprises means for encrypting the wildcard designator and the profile information identifier utilizing a private key

5 associated with the client to provide the encrypted designator.

29. A system according to Claim 28, wherein the wildcard designator comprises a client identification associated with the client, a token and an encrypted value and wherein the means for encrypting the wildcard designator and the profile information identifier comprises means for encrypting the token and the profile information identifier so as to provide the encrypted value.

30. A system according to Claim 28, wherein the means for encrypting the token and the profile information identifier further comprises means for encrypting the token, the profile information identifier and a predefined character string.

31. A system according to Claim 30, wherein the token is a randomly generated value.

32. A system according to Claim 21, further comprising means for encrypting the designator utilizing a public key of the network intermediary.

33. A system according to Claim 21, further comprising:

means for receiving the profile document transmitted by the client at the network intermediary;

5 means for decrypting the designator incorporated in the profile document if the designator is encrypted;

means for incorporating the profile information identified by the designator into the profile document to provide a modified profile document;

10 means for transmitting the modified profile document to the server.

34. A system for providing client profile information to a server, comprising:

5 means for receiving, at a network intermediary, a profile document from a client for forwarding to the server;

means for determining if a portion of the profile document is encrypted;

means for decrypting the encrypted portion of the profile document;

10 means for parsing the decrypted portion of the profile document to determine if a designator is provided in the decrypted portion of the profile document which indicates that profile information identified by the designator is to be incorporated into the profile document by the network intermediary;

15 means for incorporating the identified profile information in the profile document so as to provide a modified profile document; and

20 means for transmitting the modified profile document to the server.

35. A system according to Claim 34, wherein the designator incorporated into the profile document comprises a profile information identifier which identifies a type of profile information in the profile

5 document and a wildcard designator associated with the profile information identifier which indicates that the type of profile information associated with the profile information identifier is provided by the network intermediary.

36. A system according to Claim 35, wherein the means for decrypting the designator comprises means for decrypting the encrypted portion of the document profile utilizing a private key associated with the client to provide the designator.

37. A system according to Claim 36, wherein the wildcard designator comprises a client identification associated with the client, a token and an encrypted value and wherein the means for decrypting the encrypted portion of the document profile comprises means for decrypting the encrypted value.

38. A system according to Claim 36, wherein the token is a randomly generated value.

39. A system according to Claim 35, wherein the means for decrypting the encrypted portion of the document profile comprises:

means for decrypting the encrypted portion of the profile document to provide a wildcard designator; and

means for decrypting the profile information identifier utilizing a private key associated with the client to provide the decrypted designator.

40. A system according to Claim 34, further comprising means for decrypting the encrypted portion of the document profile utilizing a private key of the network intermediary.

41. A computer program product for providing profile information associated with a client to a server, comprising:

a computer-readable storage medium having
5 computer-readable program code embodied in said medium, said computer-readable program code comprising:

computer readable program code which generates, at the client, a profile document containing profile information associated with the client;

10 computer readable program code which incorporates in the profile document a designator which indicates that profile information identified by the designator is not provided by the client and is provided by a network intermediary in a path between the client and the server; and

15 computer readable program code which transmits the profile document with the designator from the client to the server utilizing the path.

42. A computer program product according to Claim 41, wherein the designator incorporated into the profile document comprises a profile information identifier which identifies a type of profile
5 information in the profile document and a wildcard designator associated with the profile information identifier which indicates that the type of profile

information associated with the profile information
identifier is provided by a network intermediary in the
path between the client and the server.

43. A computer program product according to Claim
41, further comprising computer readable program code
which encrypts the designator in the profile document
utilizing a key associated with the client.

44. A computer program product according to Claim
43, wherein the computer readable program code which
encrypts the designator comprises computer readable
program code which encrypts the wildcard designator
utilizing a private key associated with the client to
provide the encrypted designator.

45. A computer program product according to Claim
44, wherein the wildcard designator comprises a client
identification associated with the client, a token and
an encrypted value and wherein the computer readable
program code which encrypts the wildcard designator
comprises computer readable program code which encrypts
the token so as to provide the encrypted value.

46. A computer program product according to Claim
45, wherein the computer readable program code which
encrypts the token further comprises computer readable
program code which encrypts the token and a predefined
character string.

47. A computer program product according to Claim 45, wherein the token is a randomly generated value.

48. A computer program product according to Claim 43, wherein the computer readable program code which encrypts the designator comprises computer readable program code which encrypts the wildcard designator and the profile information identifier utilizing a private key associated with the client to provide the encrypted designator.

49. A computer program product according to Claim 48, wherein the wildcard designator comprises a client identification associated with the client, a token and an encrypted value and wherein the computer readable program code which encrypts the wildcard designator and the profile information identifier comprises computer readable program code which encrypts the token and the profile information identifier so as to provide the encrypted value.

50. A computer program product according to Claim 48, wherein the computer readable program code which encrypts the token and the profile information identifier further comprises computer readable program code which encrypts the token, the profile information identifier and a predefined character string.

51. A computer program product according to Claim 49, wherein the token is a randomly generated value.

52. A computer program product according to Claim 41, further comprising computer readable program code which encrypts the designator utilizing a public key of the network intermediary.

53. A computer program product according to Claim 41, further comprising:

computer readable program code which receives the profile document transmitted by the client at the network intermediary;

computer readable program code which decrypts the designator incorporated in the profile document if the designator is encrypted;

computer readable program code which incorporates the profile information identified by the designator into the profile document to provide a modified profile document;

computer readable program code which transmits the modified profile document to the server.

54. A computer program product for providing client profile information to a server, comprising:

a computer-readable storage medium having computer-readable program code embodied in said medium, said computer-readable program code comprising:

computer readable program code which receives, at a network intermediary, a profile document from a client for forwarding to the server;

computer readable program code which determines if a portion of the profile document is encrypted;

computer readable program code which decrypts the encrypted portion of the profile document;

15 computer readable program code which parses the decrypted portion of the profile document to determine if a designator is provided in the decrypted portion of the profile document which indicates that profile information identified by the designator is to be incorporated into the profile document by the network intermediary;

20 computer readable program code which incorporates the identified profile information in the profile document so as to provide a modified profile document; and

25 computer readable program code which transmits the modified profile document to the server.

5 55. A computer program product according to Claim 54, wherein the designator incorporated into the profile document comprises a profile information identifier which identifies a type of profile information in the profile document and a wildcard designator associated with the profile information identifier which indicates that the type of profile information associated with the profile information identifier is provided by the network intermediary.

56. A computer program product according to Claim 55, wherein computer readable program code which decrypts the designator comprises computer readable program code which decrypts the encrypted portion of

5 the document profile utilizing a private key associated with the client to provide the designator.

57. A computer program product according to Claim 56, wherein the wildcard designator comprises a client identification associated with the client, a token and an encrypted value and wherein computer readable
5 program code which decrypts the encrypted portion of the document profile comprises computer readable program code which decrypts the encrypted value.

58. A computer program product according to Claim 56, wherein the token is a randomly generated value.

59. A computer program product according to Claim 55, wherein the computer readable program code which decrypts the encrypted portion of the document profile comprises:

5 computer readable program code which decrypts the encrypted portion of the profile document to provide a wildcard designator; and

computer readable program code which decrypts the profile information identifier utilizing a private key
10 associated with the client to provide the decrypted designator.

60. A computer program product according to Claim 54, further comprising computer readable program code which decrypts the encrypted portion of the document profile utilizing a private key of the network
5 intermediary.

METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR PROVIDING SECURE CLIENT PROFILE COMPLETION BY NETWORK INTERMEDIARIES

Abstract of the Disclosure

Methods, systems and computer program products are provided which provide profile information associated with a client to a server by generating, at the client, a profile document containing profile information associated with the client and incorporating in the profile document a designator which indicates that profile information identified by the designator is not provided by the client and is provided by a network intermediary in a path between the client and the server. The designator in the profile document is encrypted utilizing a key associated with the client and the profile document with the encrypted designator transmitted from the client to the server utilizing the path. Method, systems and computer program products corresponding to the network intermediaries are also provided.

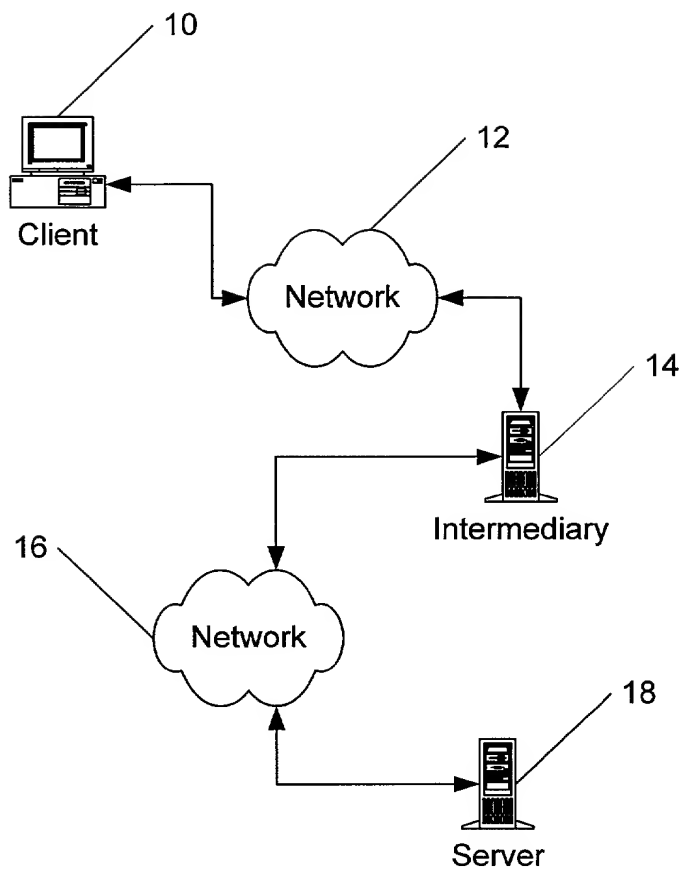


Figure 1

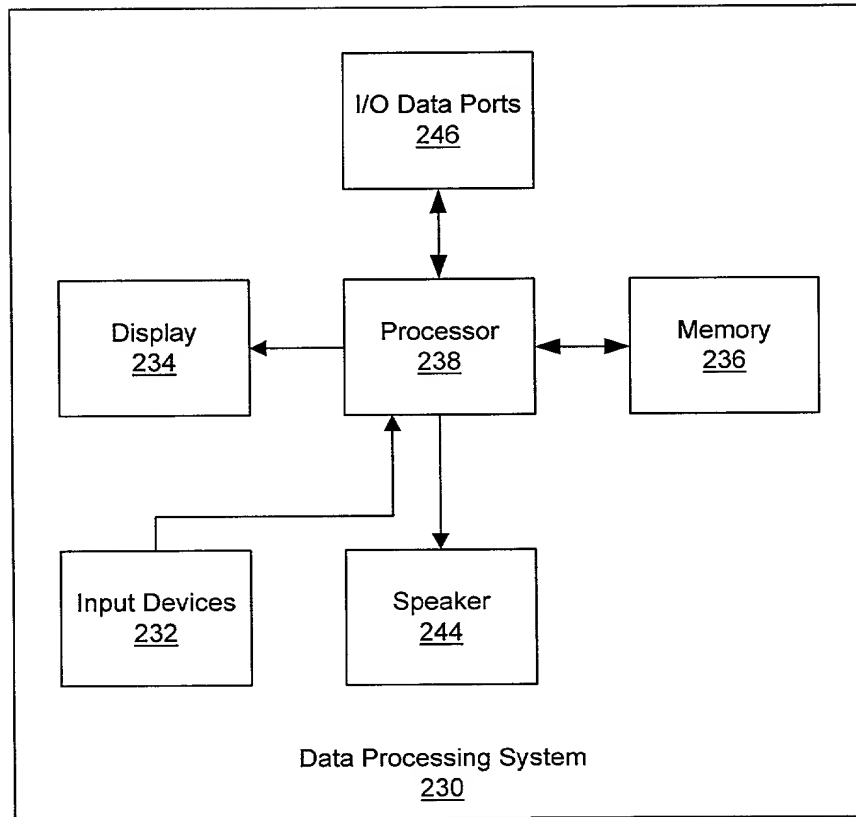


Figure 2

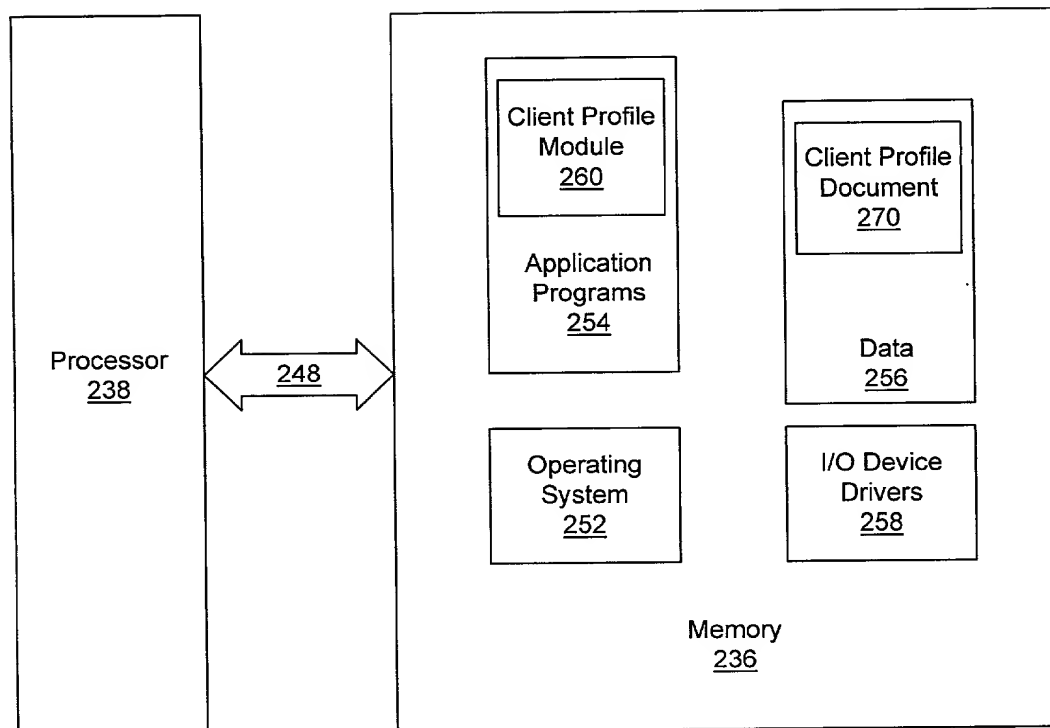


Figure 3

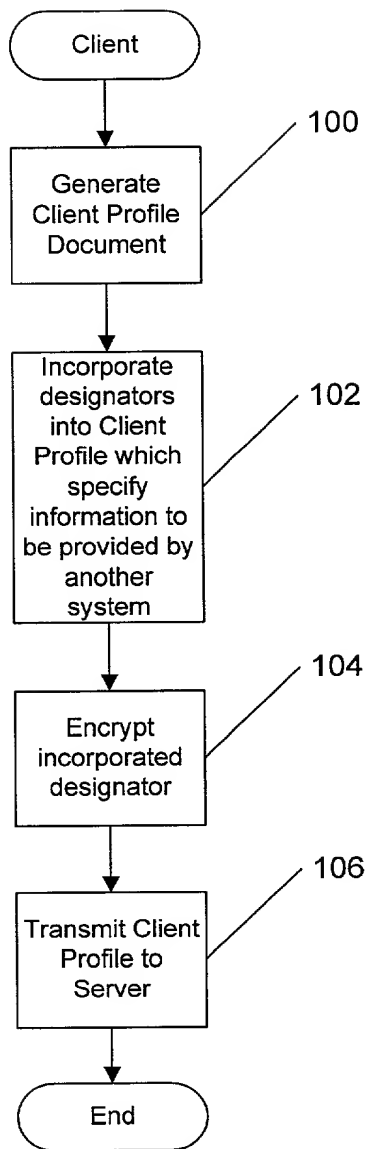


Figure 4

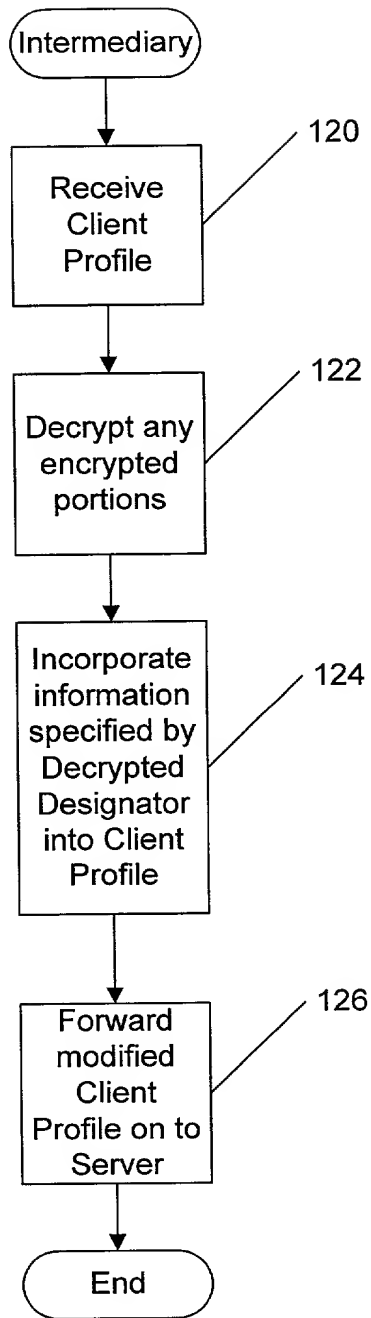


Figure 5

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Hild, et al.

Serial No.: To Be Assigned

Filed: Concurrently Herewith

For: METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR
PROVIDING SECURE CLIENT PROFILE COMPLETION BY NETWORK
INTERMEDIARIES

March 22, 2000

BOX PATENT APPLICATION

Assistant Commissioner for Patents

Washington, DC 20231

SUBMITTAL OF DECLARATION

Sir:

Enclosed are two Declarations and Powers of Attorney for the above-identified application which have been executed by the respective named inventors.

Respectfully submitted,



Timothy J. O'Sullivan
Registration No. 35,632

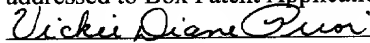
Myers Bigel Sibley & Sajovec
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CERTIFICATE OF EXPRESS MAILING

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Date of Deposit: March 22, 2000

I hereby certify that this correspondence is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Box Patent Application, Assistant Commissioner For Patents, Washington, DC 20231.



Vickie Diane Prior

Date of Signature: March 22, 2000

ENGLISH LANGUAGE DECLARATION CONTINUED

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

Attorney Docket No. 5577-190

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR PROVIDING SECURE CLIENT PROFILE COMPLETION BY NETWORK INTERMEDIARIES**,

the specification of which

is attached hereto

OR

was filed on _____ as United States Application No. or PCT International Application Number _____ and was amended on ____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below any foreign application for patent or inventor's certificate, or of any PCT International application having a filing date before that of the application on which priority is claimed.

None			<input type="checkbox"/> Yes <input type="checkbox"/> No
Number	Country	MM/DD/YYYY Filed	Priority Claimed
			<input type="checkbox"/> Yes <input type="checkbox"/> No

ENGLISH LANGUAGE DECLARATION CONTINUED

Number	Country	MM/DD/YYYY Filed	Priority Claimed
			[] Yes [] No
Number	Country	MM/DD/YYYY Filed	Priority Claimed

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

None	
Application Number(s)	Filing Date (MM/DD/YYYY)
Application Number(s)	Filing Date (MM/DD/YYYY)

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or § 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application (37 C.F.R. § 1.63(d)).

None		
Appln. Serial No.	Filing Date	Status Patented/Pending/Abandoned
Appln. Serial No.	Filing Date	Status Patented/Pending/Abandoned

ENGLISH LANGUAGE DECLARATION CONTINUED

Appln. Serial No.	Filing Date	Status Patented/Pending/Abandoned

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

ENGLISH LANGUAGE DECLARATION CONTINUED

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following registered attorney(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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Inventor's
Signature: 

Date: 13-3-00

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Inventor's

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Citizenship: United States of America

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Raleigh, North Carolina 27605-1271

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

Attorney Docket No. 5577-190

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **METHODS, SYSTEMS AND COMPUTER PROGRAM PRODUCTS FOR PROVIDING SECURE CLIENT PROFILE COMPLETION BY NETWORK INTERMEDIARIES,**

the specification of which

☒ is attached hereto

OR

☐ was filed on _____ as United States Application No. or PCT International Application Number _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

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None			[] Yes [] No
Number	Country	MM/DD/YYYY Filed	Priority Claimed
			[] Yes [] No
Number	Country	MM/DD/YYYY Filed	Priority Claimed
			[] Yes [] No
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ENGLISH LANGUAGE DECLARATION CONTINUED

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None	
Application Number(s)	Filing Date (MM/DD/YYYY)
Application Number(s)	Filing Date (MM/DD/YYYY)

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or § 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application (37 C.F.R. § 1.63(d)).

None		
Appln. Serial No.	Filing Date	Status Patented/Pending/Abandoned
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

ENGLISH LANGUAGE DECLARATION CONTINUED

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following registered attorney(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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(919) 854-1400

Facsimile:

(919) 854-1401

Full name of first (sole) inventor: **Stefan Georg Hild**

Inventor's

Signature: _____ Date: _____

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ENGLISH LANGUAGE DECLARATION CONTINUED

Full name of second inventor: **Sandeep Kishan Singhal**

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